of the first control device according to the first embodiment, the configuration of the first control device according to the second embodiment, and the configuration of the first control device according to the third embodiment are combined. In the position feedback loop, a position signal from the position detector **59** is used.

[0122] The acceleration detector **60** is disposed at the machine structure **57**. An acceleration signal outputted from the acceleration detector **60** is transmitted to the stabilization compensation circuit **121** for machine structure. The position detector **59** is disposed at the axis feed mechanism **56**. A position signal outputted from the position detector **59** is transmitted to the stabilization compensation circuit **122** for axis feed mechanism. Further, to the servo motor **55**, the speed detector **58** is attached. A speed signal outputted from the speed detector **58** is transmitted to the stabilization compensation circuit **123** for motor.

[0123] In the respective stabilization compensation circuits **121**, **122**, **123**, a correction signal with respect to an acceleration is generated, and is added in adders **161**, **162**. An acceleration feedback circuit is configured. An output signal of the adder **162** is subtracted from the torque command τr in the adder **144**.

[0124] In addition, in the stabilization compensation circuit **121** for machine structure and the stabilization compensation circuit **122** for axis feed mechanism, a correction signal with respect to a speed for cancelling a speed deflection generated due to the acceleration feedback circuit is generated and added in an adder **163**. An output signal of the adder **163** is added to the speed command ωr in the adder **151**. Further, in the stabilization compensation circuit **121** for machine structure and the stabilization compensation circuit **122** for axis feed mechanism, a correction signal with respect to a position for cancelling a position deflection generated due to the acceleration feedback circuit is generated and added in an adder **164**. An output signal of the adder **164** is added to the position command qr in the adder **152**.

[0125] FIG. **13** shows a block diagram of the second control device and the drive mechanism of the machine structure according to the present embodiment. The second control device according to the present embodiment has a configuration in which the configuration of the second control device according to the first embodiment, the configuration of the second control device according to the second embodiment, and the configuration of the second control device according to the third embodiment are combined.

[0126] In the second control device, as the feed axis command inputted into the stabilization compensation circuit **121** for machine structure and the stabilization compensation circuit **122** for axis feed mechanism, the position command qr uncorrected is inputted. The position command qr outputted from the interpolation calculation part **53** is inputted into the stabilization compensation circuit **121** for machine structure and the stabilization compensation circuit **122** for axis feed mechanism. The other configurations are similar to the first control device according to the first embodiment.

[0127] Thus, in the machine tool including the three inertial systems, the control circuit according to the first embodiment and the control circuit according to the second embodiment are combined, whereby a vibration of the machine structure **57** can be restrained. Further, the control circuit for stabilizing a drive of the servo motor **55** according to the third embodiment is combined, whereby the stabilization control including stabilizing a drive of the servo motor **55** can be performed.

[0128] The control device according to the present embodiment includes three stabilization compensation circuits which are the stabilization compensation circuit **121** for machine structure, the stabilization compensation circuit **122** for axis feed mechanism, and the stabilization compensation circuit **123** for motor, but this configuration is not limitative, and, out of the three stabilization compensation circuits, two optional stabilization compensation circuits may be included.

[0129] The other configurations, operations, and effects are similar to any of the first to three embodiments, description of which will not be accordingly repeated.

[0130] The embodiments as described above can be suitably combined. In each control as described above, the order of the steps can be changed within a range in which functions and operations are not changed.

[0131] In each drawing as described above, the same or similar components are assigned the same reference signs. Note that the embodiments as described above are illustrative and are not to limit the invention. Moreover, the embodiments include modifications of the embodiments recited in the claims.

REFERENCE SIGNS LIST

[0132] **1** workpiece
[0133] **10** machine tool
[0134] **14** table
[0135] **20** spindle
[0136] **22** tool
[0137] **25** Z-axis servo motor
[0138] **28** Z-axis guide rail
[0139] **29**, **33**, **39** speed detector
[0140] **30** Z-axis linear scale
[0141] **31** Y-axis servo motor
[0142] **32** Y-axis guide rail
[0143] **34** Y-axis linear scale
[0144] **36** X-axis guide rail
[0145] **38** X-axis servo motor
[0146] **40** X-axis linear scale
[0147] **45**, **46** acceleration detector
[0148] **50** control device
[0149] **54** servo motor control part
[0150] **55** servo motor
[0151] **56** axis feed mechanism
[0152] **57** machine structure
[0153] **58** speed detector
[0154] **59** position detector
[0155] **60** acceleration detector
[0156] **71** position controller
[0157] **72** speed controller
[0158] **91-96** compensator
[0159] **101-102** compensator
[0160] **121** stabilization compensation circuit for machine structure
[0161] **122** stabilization compensation circuit for axis feed mechanism
[0162] **123** stabilization compensation circuit for motor

1. A feed axis control method of a machine tool a cascade connection in which a speed feedback loop including a speed control part into which a speed command is inputted is provided inside a position feedback loop including a